AMC 1022 STD.

INSTRUCTIONS

AMC-1022 STANDARD SENSOR UNIT

INSTALLATION AND OPERATING INSTRUCTIONS FOR THE AMC-1022 WITH STANDARD SENSOR

IMPORTANT:

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE BEGINNING INSTALLATION AND/OR OPERATION OF THIS EQUIPMENT.

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WARRANTY

The AMC-1022 gas monitor is warranted against defects in material and workmanship for a period of two years from date of delivery. During the warranty period, The *Armstrong Monitoring Corporation* will repair or replace components that prove to be defective in the opinion of AMC. We are not liable for auxiliary interfaced equipment, or consequential damage. This warranty shall not apply to any product, which has been modified in any way, which has been repaired by any other party other than a qualified technician or authorized AMC representative, or when such failure is due to misuse or conditions of use.

LIABILITY

All AMC products must be installed and maintained according to instructions. Only qualified technicians should install and maintain the equipment.

AMC shall have no liability arising from auxiliary interfaced equipment, for consequential damage, or the installation and operation of this equipment. AMC shall have no liability for labour or freight costs, or any other costs or charges in excess of the amount of the invoice for the products.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND SPECIFICALLY THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE THEREOF.

MODIFICATIONS AND SUBSTITUTIONS

Due to an ongoing development program, AMC reserves the right to substitute components and change specifications at any time without incurring any obligations.

PRODUCT RETURN

All products returned for warranty service will be by prepaid freight and they will only be accepted with an R.M.A number issued by AMC. All products returned to the client will be freight collect.

1 PRODUCT DESCRIPTION

In this section a general product description is given followed by a detailed list of the AMC-1022 unit's internal features.

1.1 GENERAL DESCRIPTION

The AMC-1022 is a one sensor gas monitoring system designed to continuously monitor surrounding air for traces of hazardous gases (listed in Product Information, pg. v). It can be calibrated to detect a wide variety of toxic gases. The monitor comes with the following features as shown in Figure 1-2, Figure 1-3, and Figure 1-4.

1) SENSOR: long life solid state, no maintenance, factory calibrated.

2) POWER ON INDICATOR: power is indicated by a GREEN LED.

3) FAIL INDICATOR: sensor signal fail is indicated by an amber LED (only when this option is installed).

4) HIGH ALARM: high levels of gas are indicated by a RED LED.

5) LOW ALARM: low levels of gas are indicated by a YELLOW LED.

6) TEST SWITCH: the test switch is provided to electronically simulated alarms in order to test the low and high alarm indicators, the relays, and the audio alarm indicator.

7) HIGH ALARM ADJUST: sets the HIGH alarm trip point.

8) LOW ALARM ADJUST: sets the LOW alarm trip point.

9) SIGNAL ADJUST: sets the sensitivity of the sensor.

10) THREE CIRCUIT MINIATURE SWITCH: each actuator on the miniature switch controls a different circuit as shown in Figure 1-1. If the actuator is set in the UP position, its corresponding circuit is ON. If the actuator is set in the DOWN position, the circuit is OFF.

- LEFT ACTUATOR: provides a TEN minute time delay, when the switch in ON, to eliminate unnecessary alarms caused by momentary exposure to high levels of gases
- MIDDLE ACTUATOR: provides a FIVE minute time delay, when the switch is ON, to eliminate unnecessary alarms caused by momentary exposure to low levels of gases
- RIGHT ACTUATOR: controls the audio alarm indicator. When ON, the buzzer will activate when a high alarm condition occurs

11) AUDIO ALARM INDICATOR: when operational (see item 10), the buzzer will activate when a high alarm condition occurs

12) RELAYS: there are two DPDT relays which work with high alarm and low alarm, respectively

13) TRANSFORMER: Class II, step down transformer runs the internal circuitry at low voltages

14) POWER TERMINAL BLOCK: for line voltage connections (120 VAC, 60 Hz)

15) CLAMPS: to secure the front panel, restricting to access to internal controls

16) SENSOR TERMINAL BLOCK: for sensor connections

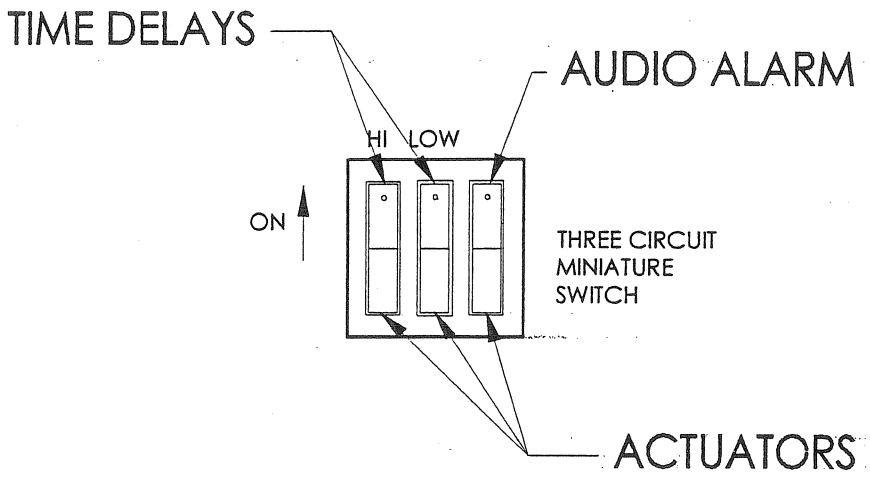


Figure 1-1 – Three circuit miniature switch (dwg# 2596)

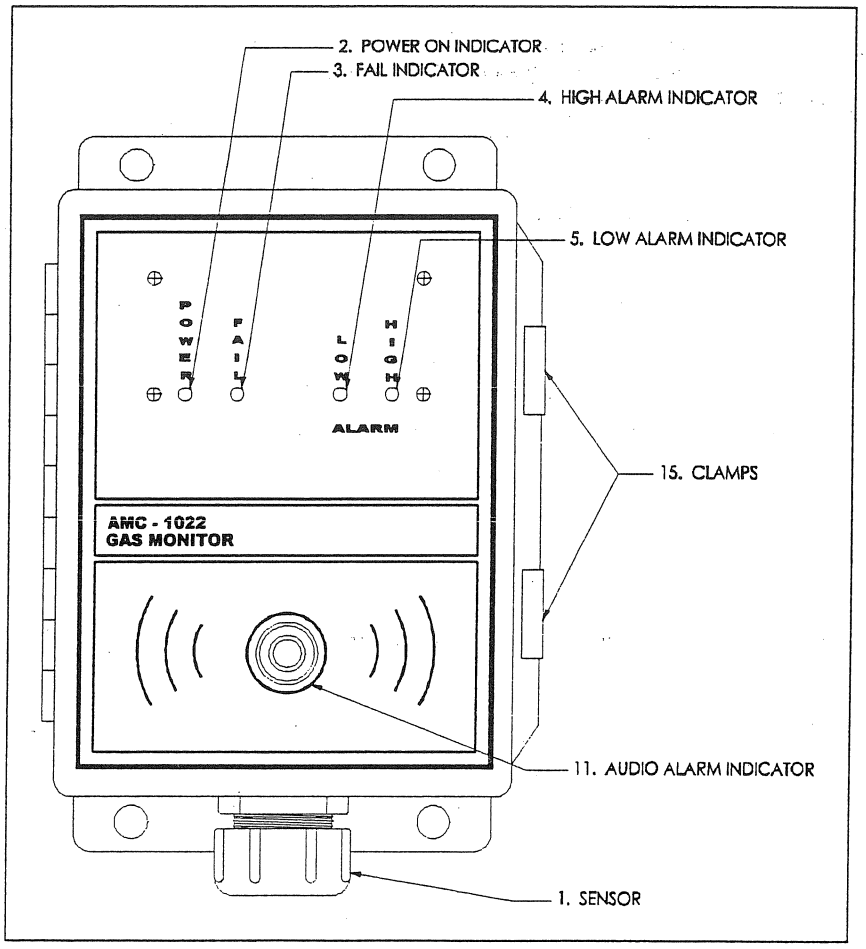


Figure 1-2 - AMC 1022 monitor, front panel (dwg# 2586)

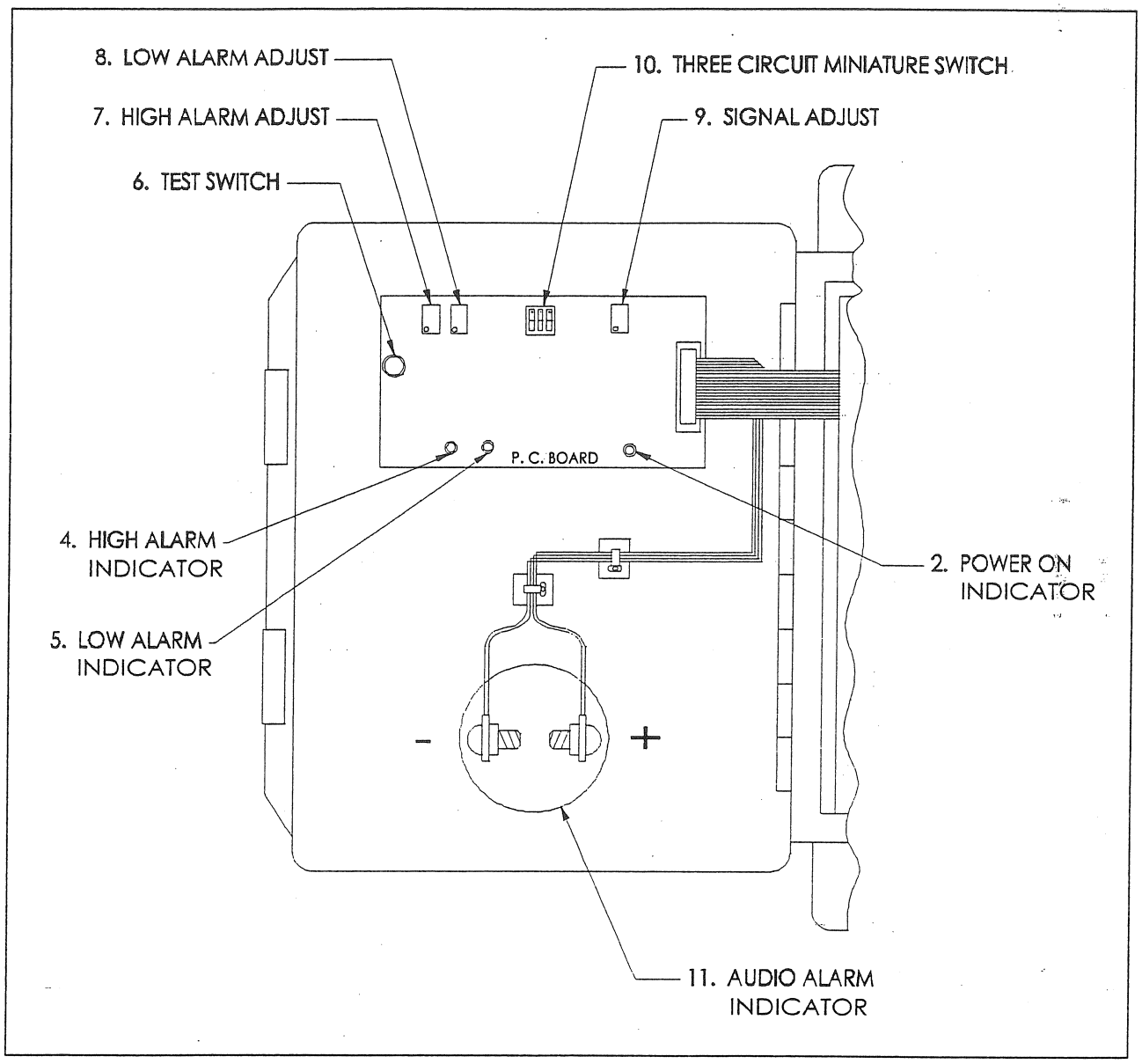


Figure 1-3 - AMC 1022 monitor, inside front panel (dwg# 2595)

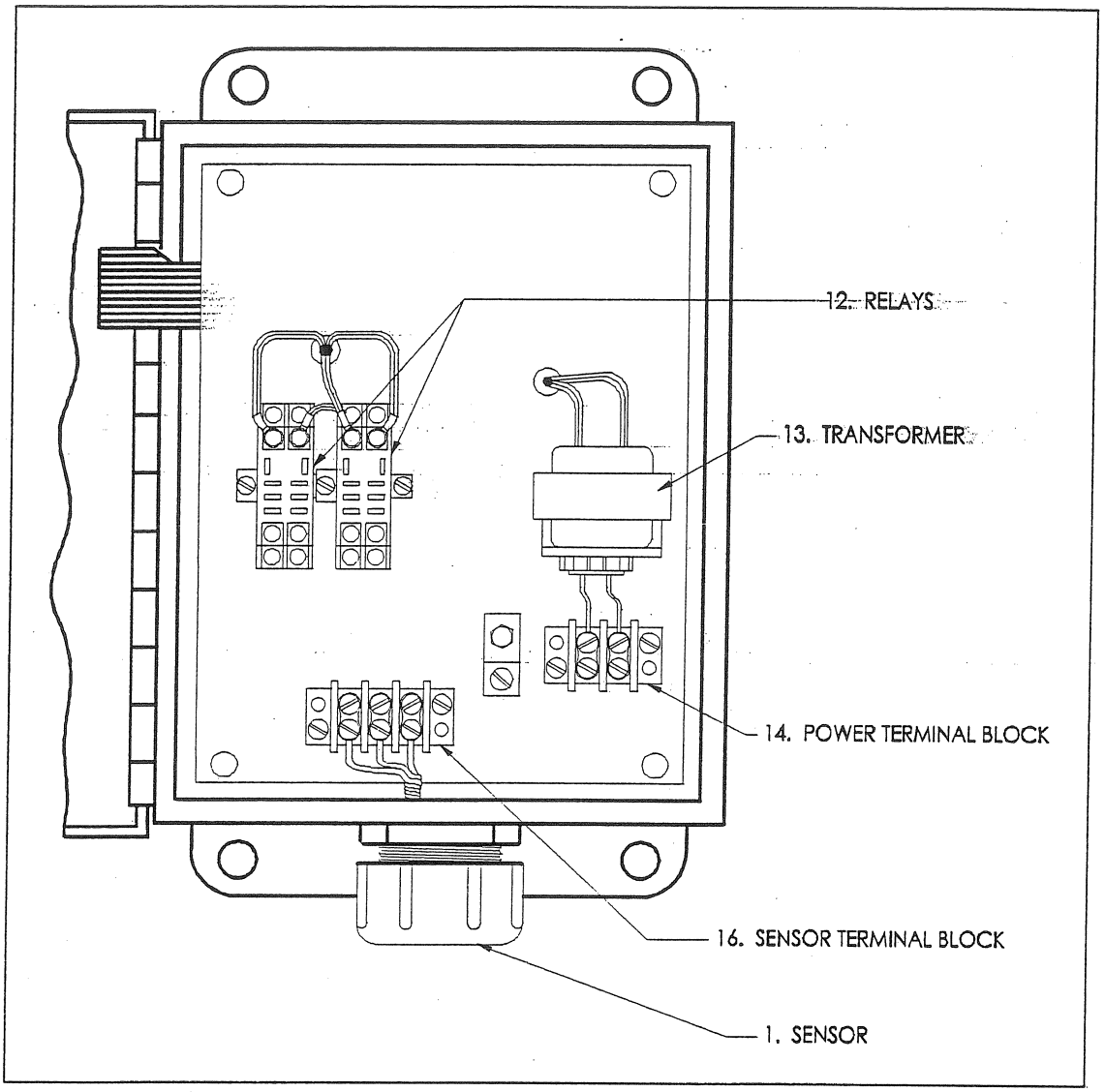


Figure 1-4 - AMC 1022 Monitor, inside power/relay panel (dwg# 2588)

2 INSTALLATION

This section discusses topics relating to the proper installation of the AMC-1022 unit. The proper location, sensor wiring selection, and multi-unit interconnection are all discussed in detail in the following section.

2.1 LOCATION AND MOUNTING

Care should be taken to securely fasten the monitor (via 4 mounting holes provided) to a solid, vertical, nonvibrating surface or structure at eye level height. See Figure 2-1 for mounting dimensions.

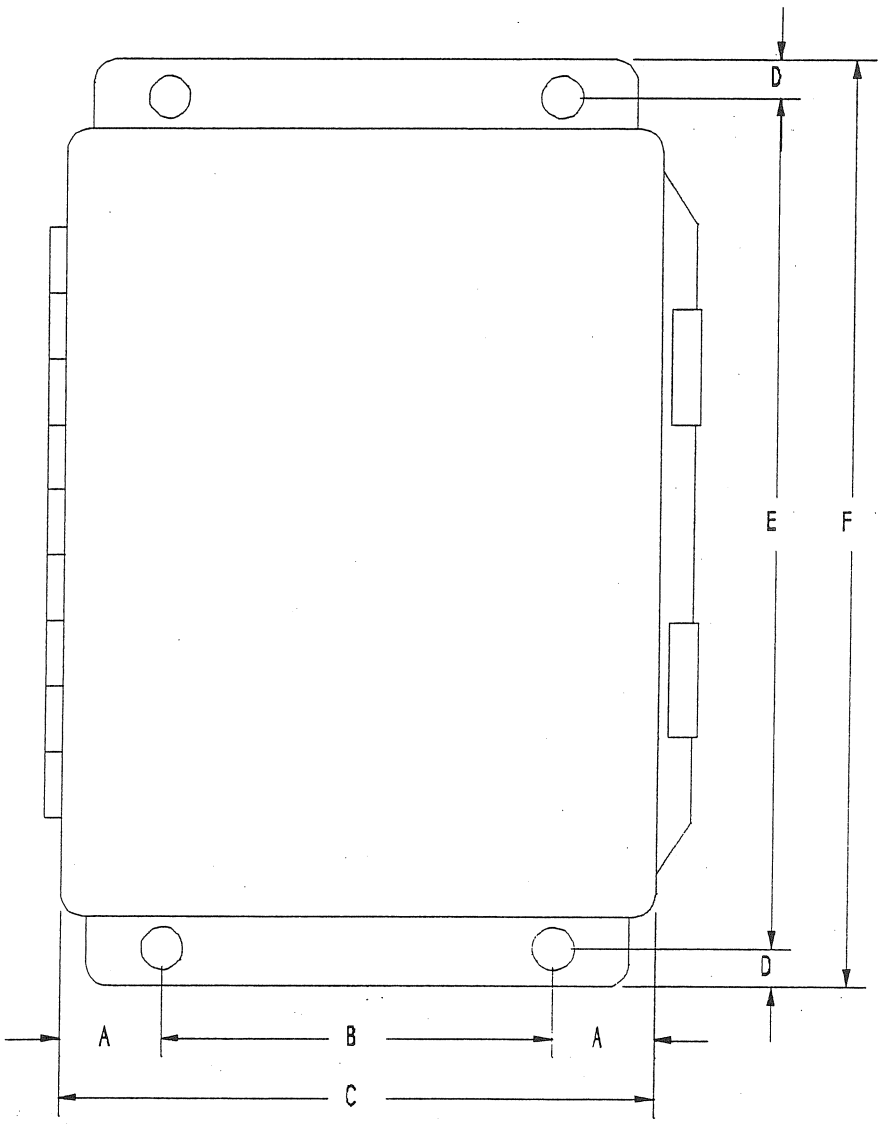
Mount the monitor in an area where the local concentration of gas is unaffected by the presence of ventilation systems. Two knockouts are supplied at the bottom of the enclosure for connecting one half of an inch conduit. One opening is used for AC power, and the other may be used for relay circuits.

2.2 WIRING OF THE MONITOR

POWER SUPPLY: The monitor operated on 120 VAC, 60 Hz. A class II step down transformer runs the internal circuitry at low voltages. The power supply connections are made at the power terminal block located inside the monitor (Figure 2-2).

RELAYS: There are two DPDT relays which work with high alarm and low alarm respectively (see Figure 1-4). Alarms energize the relays causing contact transfer. The relay contacts are available for activating a remote alarm and/or, in some applications, an exhaust fan. Relays are rated 1/3 hp @ 120 VAC/240 VAC; 10 Amp. @ 28 VDC/120 VAC/240 VAC, resistive. See Figure 2-3 for relay contact arrangement.

SENSOR: The sensor is wired to a sensor (-, sig, +) terminal block located on the inner panel of the monitor, see Figure 2-2. For the sensor replacement procedure, refer to section 4.3 and Figure 4-1.



DIMENSIONS IN INCHES	A	B	C	D	E	F	DEPTH*
	1.35	4.0	6.7	0.37	8.75	9.5	4.0

Figure 2-1 - Monitoring mounting dimensions (dwg# 2590)

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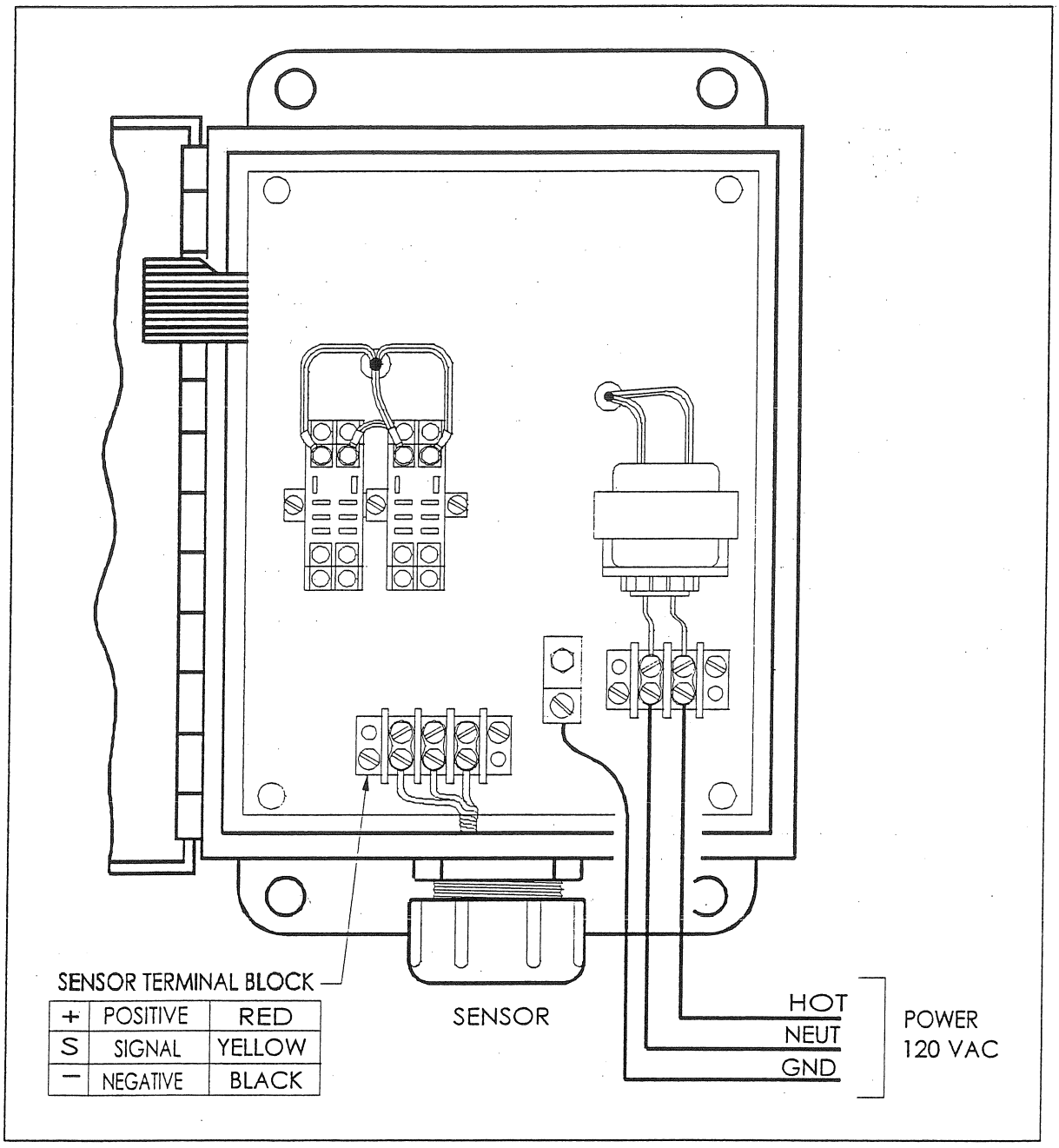

Figure 2-2 - Monitor power connections and sensor wiring (dwg# 2589)

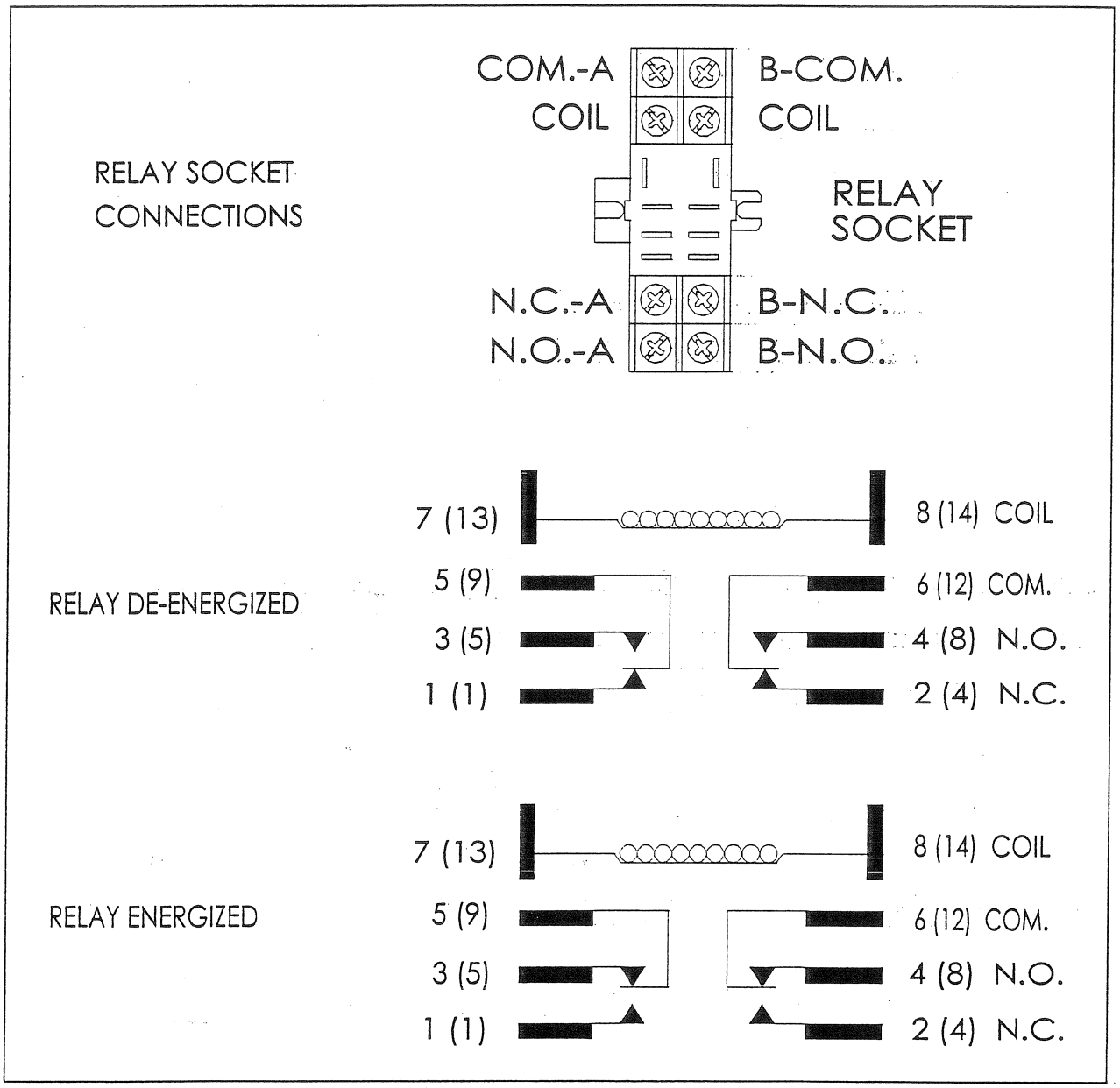

Figure 2-3 - Relay wiring diagram (dwg# 2591)

3 OPERATION AND CALIBRATION

This section covers instructions for the proper operation and calibration of the AMC-1022 units. The operation principles are described in further detail, followed by different types of periodic adjustments that might be required throughout the lifetime of the equipment.

3.1 OPERATION

NOTE:

BEFORE TURNING ON THE MAIN POWER TO THE MONITOR, MAKE SURE ALL WIRING CONNECTIONS ARE PROPERLY MADE.

When power is applied, the GREEN power LED will light. A one minute time delay eliminates false alarms from occurring during the sensor's warm up period. After this time delay, the unit becomes fully operational. If time delays are required or the audio alarm indicator is not needed, the three circuit minature switch can be set accordingly, refer to Section 1.1, Item 9, and Figure 1-1.

If any gas exceeds the low alarm trip point setting, the yellow LED and low alarm relay will be activated. Likewise, if any gas exceeds the high alarm trip point setting, the red LED, high alarm relay and buzzer will be activated.

3.2 CALIBRATION

The AMC 1022 gas monitor is factory calibrated at levels based on set standards. Calibration of the monitor should be performed every 6 months, unless the alarm trip point settings need to be changed. The monitor operates with a standard sensor assembly and all on-site adjustments are made at the monitor. Recalibration is necessary when either replacing the sensor or changing the alarm trip point settings. Use Armstrong's calibration chamber P/N AMC-CK2700-00 with calibration kit P/N AMC-CK2602-00 (specify gas).

NOTE:

BEFORE MAKING ANY CHANGES TO ALARM LEVEL SETTINGS WE RECOMMEND CONSULTING THE ARMSTRONG MONITORING CORPORATION FOR ADVICE ON SETTING THE PROPER TRIP POINT VOLTAGE FOR A SPECIFIC GAS ALARM CHANGE.
IF A GAS SAMPLE IS TAKEN FROM VOLATILE LIQUID VAPOURS, THEN ONLY THE CALIBRATION CHAMER IS NEEDED.

3.2.1 SETTING UP CHAMBER AND APPLYING GAS

To set up the calibration chamber, prior to applying gas to the sensor, follow the procedure shown in Figure 3-1. Once the calibration chamber is set up, gas sample can be taken and injected into the chamber for calibration, following the procedures shown in Figure 3-2 and Figure 3-3. Measure gas in the 1 cc syringe to obtain the desired concentration (see following chart).

Volume of Pure Gas (cc)	Equivalent Concentration (ppm)
0.1	50
0.2	100
0.3	200
0.4	400

NOTE:

ALLOW 5 MINUTES WARM UP FOR SENSOR TO STABILIZE BEFORE INJECTING GAS SAMPLE.
FOR CO, MEASURE VOLUME x 4 TO OBTAIN DESIRED CONCENTRATION
(eg. 0.1cc x 4 = 0.4 cc for 50 ppm)

3.2.2 ADJUSTMENTS

To observe immediate reaction during calibration, the low and high alarm time delays should be disabled. All calibration is made using the three trimmers along the top edge of the circuit board as shown Figure 3-4.

The low alarm adjust is used to establish the low alarm trip point. This is done by exposing the sensor to the low alarm gas concentration and adjusting the LOW trimmer clockwise until the YELLOW LED just lights.

The high alarm adjust is used to establish the high alarm trip point. This is done by exposing the sensor to the high alarm gas concentration and adjusting the HI trimmer clockwise until the RED LED just lights.

NOTE:

IF THE SENSOR HAS BEEN REPLACED, ADJUST THE SIGNAL FIRST, THEN PROCEED WITH LOW ALARM AND HIGH ALARM ADJUSTMENTS. SIGNAL CALIBRATION IS PERFORMED USING A DIGITAL MULTIMETER SET TO MEASURE DC VOLTAGES TO TWO (2) DECIMAL PLACES (E.G. 0.00 VOLTS).

The SIGNAL adjust is used to set the sensitivity of the sensor. This is done by exposing the sensor to the LOW alarm concentration of gas. The voltage associated with signal can be measured at the test point immediately above and to the left of the SIG trimmer as shown in Figure 3-4. The voltage measured at the signal test point should be approximately 3.0 volts.

When calibration is completed, remove the calibration chamber, replace the sensor element, retainer ring, filter and screw on cap in the order shown Figure 3-1.

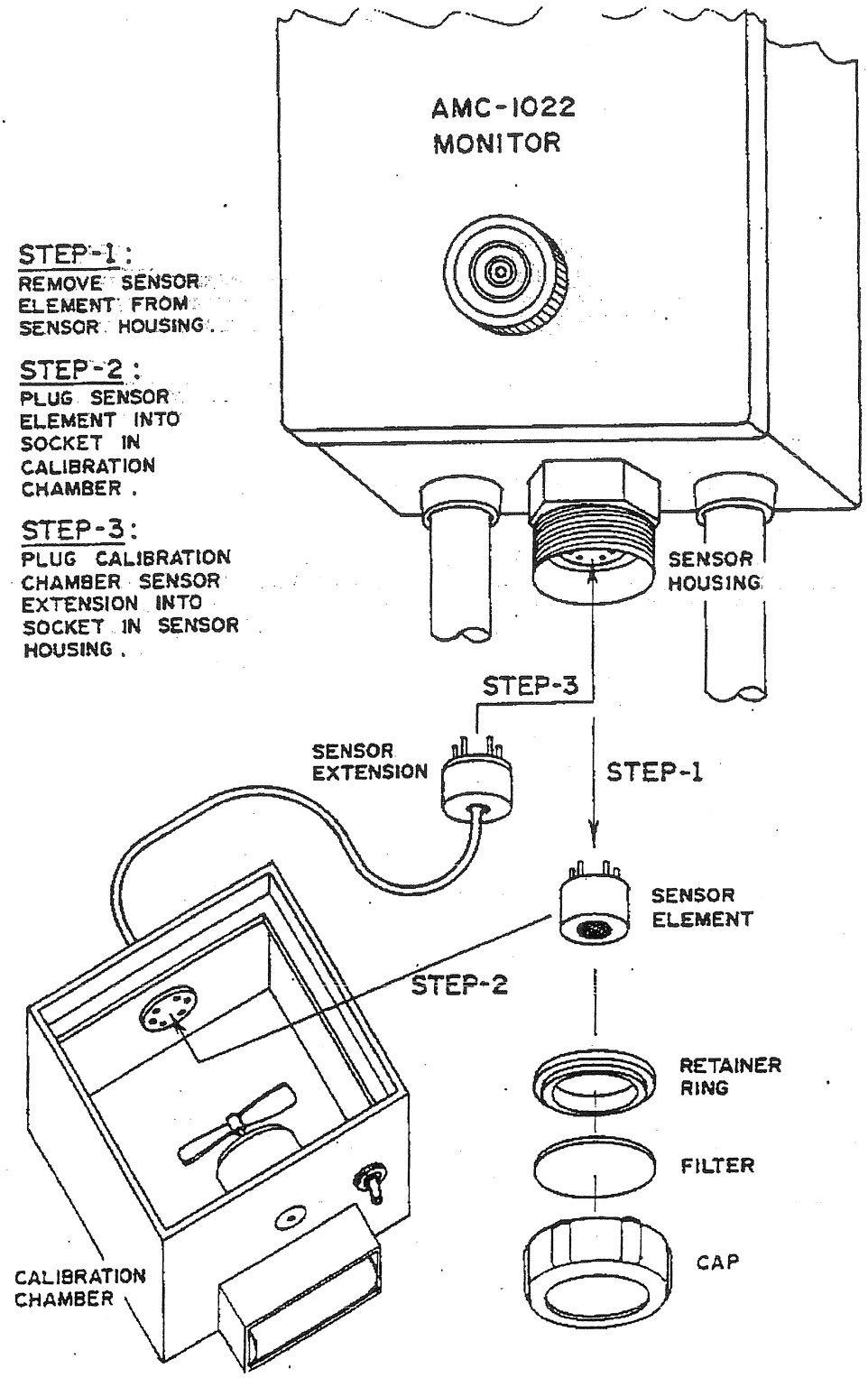

Figure 3-1 - Calibration chamber set up procedure

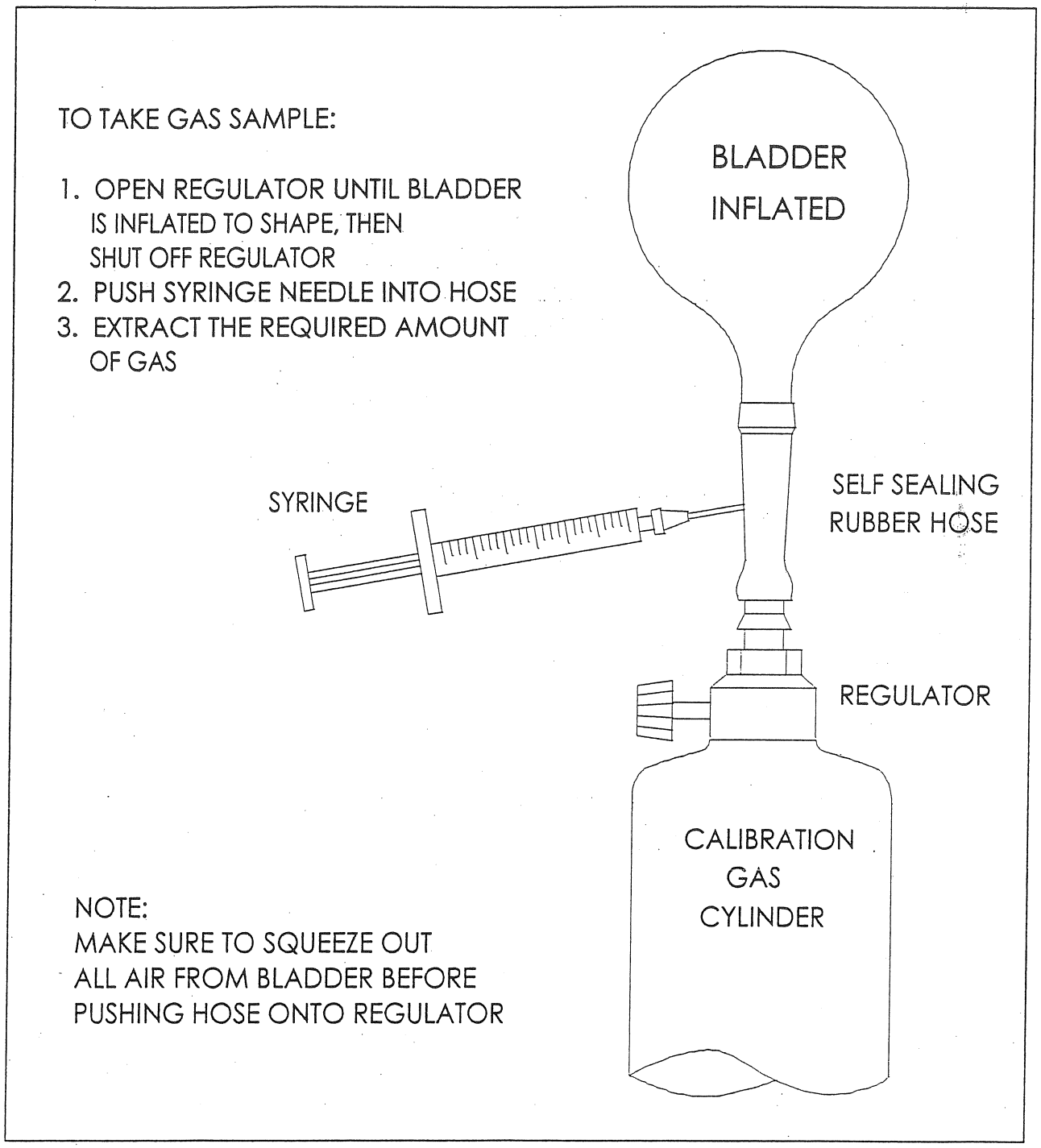

Figure 3-2 - Taking gas sample (dwg# 2592)

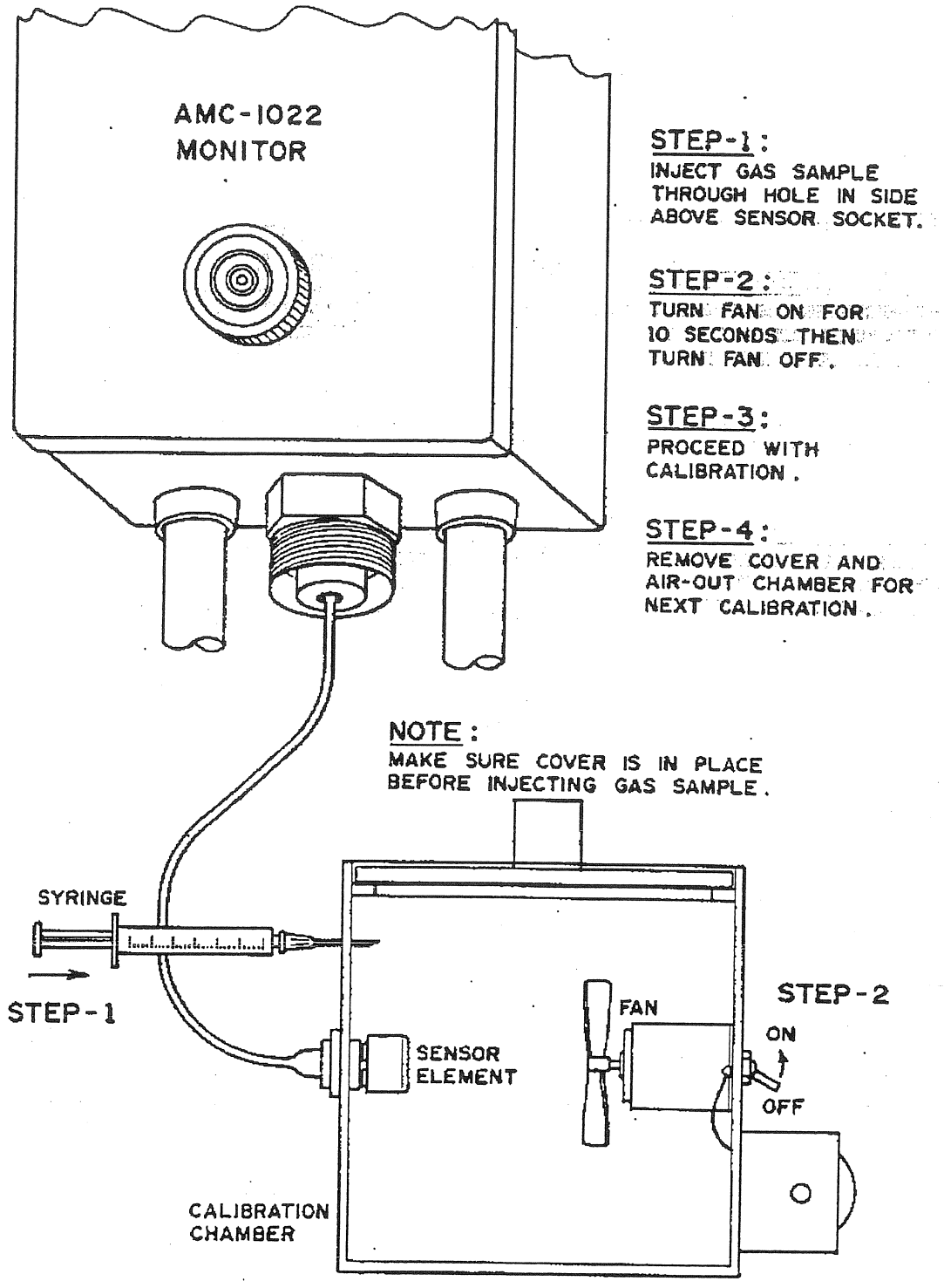

Figure 3-3 - Injecting gas sample for calibration

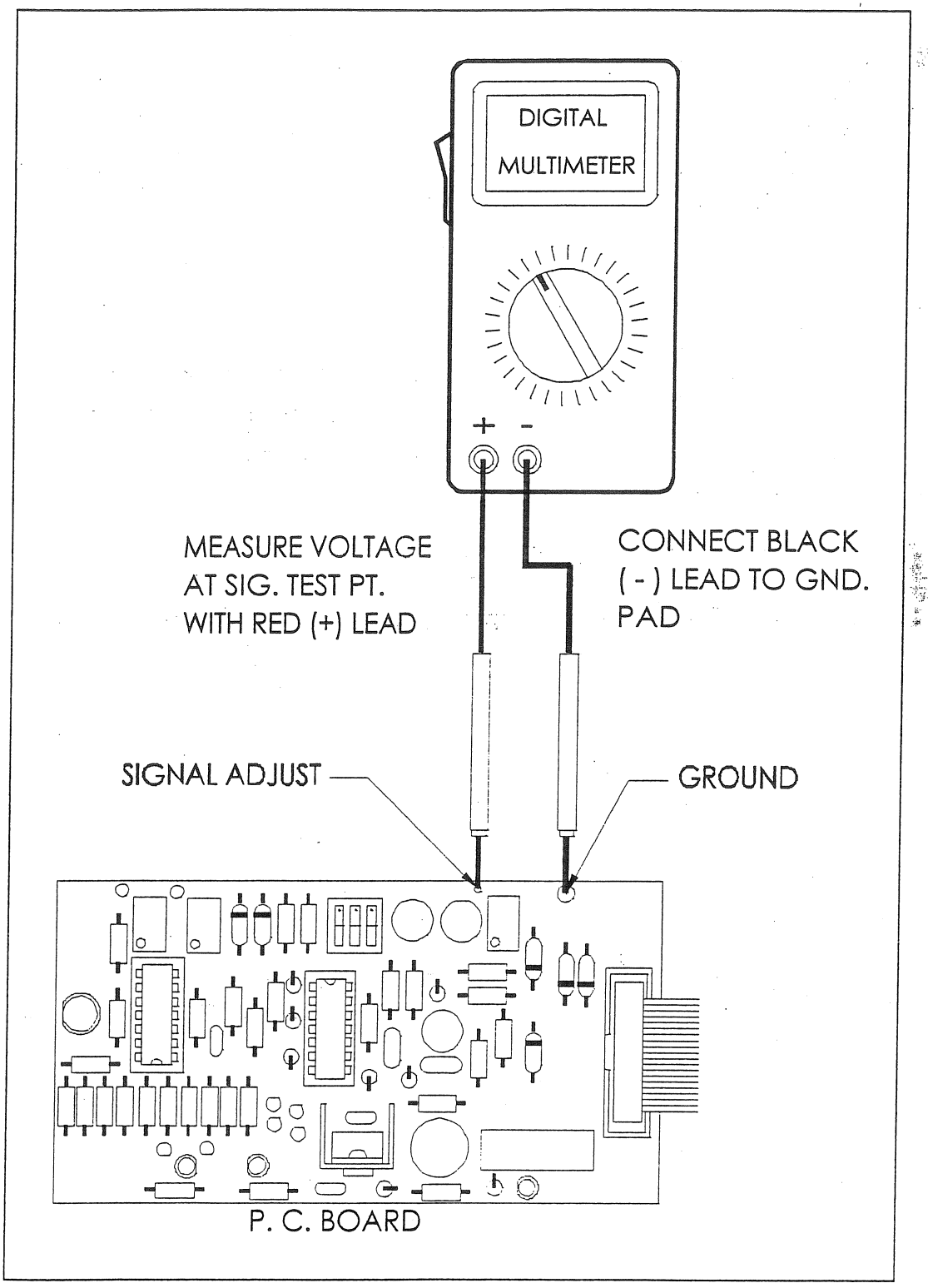

Figure 3-4 - Trimmer adjustment and test point locations (dwg# 2593)

4 MAINTENANCE

This section covers topics related to the maintenance of the AMC-1022 units. A general description of maintenance to be carried out is followed by a verification of operation and then details about the sensor replacement.

4.1 GENERAL

The monitor and sensor unit should be wiped clean with a damp cloth following a regular maintenance program. Avoid spraying, submersion and other conditions that could cause a liquid to enter the monitor and/or sensor and cause possible intrinsic damage to internal components.

4.2 VERIFICATION OF OPERATION

To verify the operation of the monitor and sensor unit, make sure that they are responding to gas. This test should be performed regularly, every 3 months, but for more demanding applications, verifications should be performed on a weekly basis.

4.3 SENSOR REPLACEMENT

CAUTION:

TURN OFF THE POWER SUPPLY BEFORE ATTEMPTING THE FOLLOWING PROCEDURE.

Sensor life is typically in excess of 10 years. The sensor should be replaced under the following conditions:

1. When the sensor element becomes an open circuit
2. When the sensor no longer responds to the presence of gas

When the sensor needs replacing, reorder Part No. listed in Product Information (pg. v). To replace the sensor element, unscrew the cap (including filter and retaining ring) from the sensor housing.

Unplug the used sensor element from its socket and discard, the plug in the replacement sensor element. Reinstall the retainer ring, filter, and screw on cap. See Figure 4-1 for sensor replacement procedure.

NOTE:

ALLOW 24 HOURS FOR THE NEW SENSOR ELEMENT TO STABILIZE (BURN-IN) BEFORE RECALIBRATION, THEN FOLLOW INSTRUCTIONS IN THE CALIBRATION SECTION 3.2 OF THIS MANUAL.

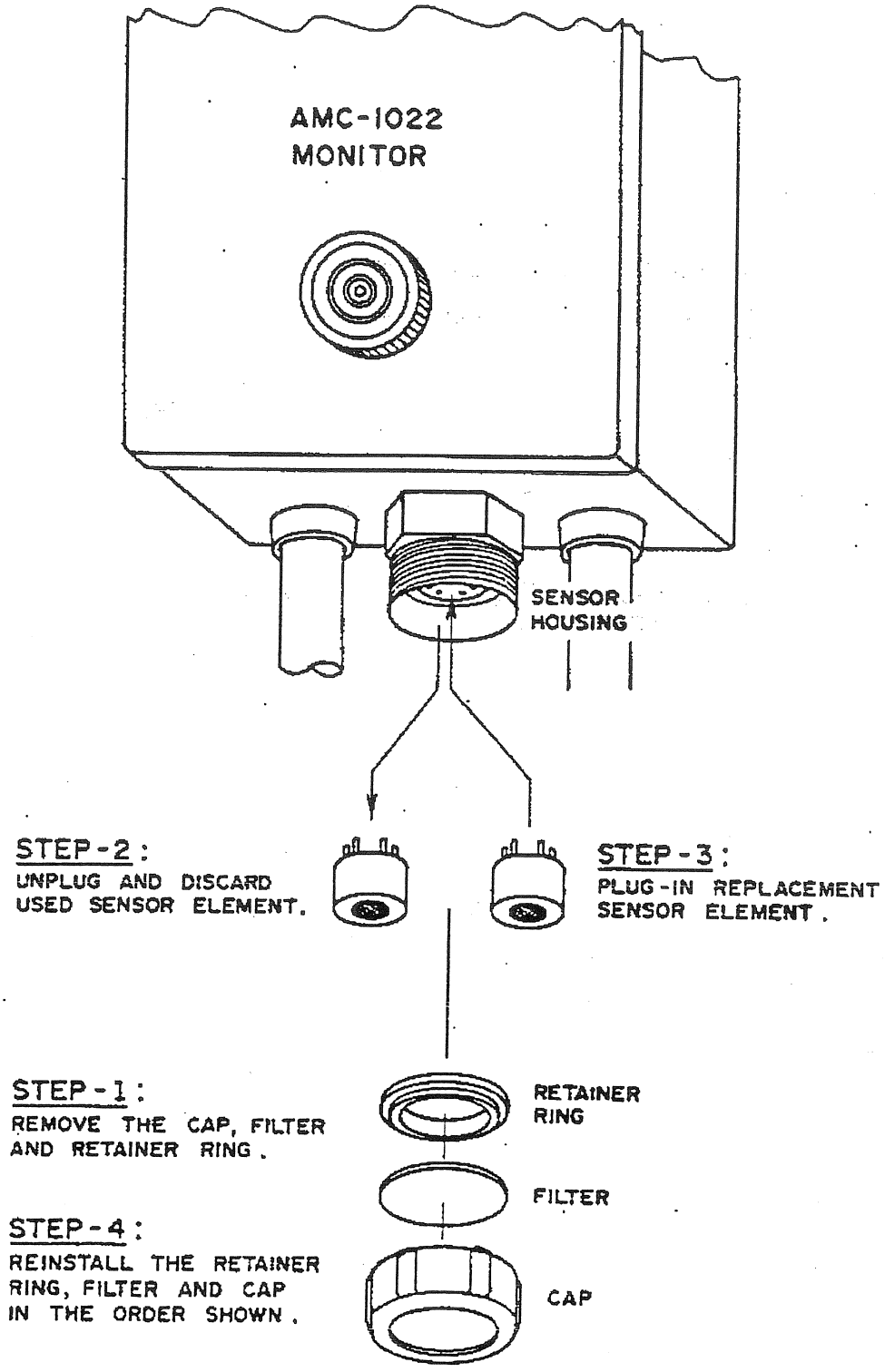

Figure 4-1 - Sensor replacement procedure

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